Subject: Re: Help optimizing the nested for loops
Posted by Craig Markwardt on Fri, 25 Feb 2005 15:09:02 GMT
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Messon Gbah <gbah@umich.edu> writes:

> Could some one help get rid of nested for loops in the following statements?
> The original code was written in C and I'm trying to port it to IDL.
>
> indx = indgen(n)
> indx[0] = 3
> index[3] = 0
> array = dblarr(n,n)
> alpha = dblarr(n,n)
> beta = dblarr(n)
>
> ;Loop 1
> trace = double(0.0)
> for j=0, n-1 do begin
> vj = indx[j]
> trace += alpha[vj,vj]
> alpha[vj,vj] += flamda ;flamda = a constant
> for k=0,j do alpha[vj,indx[k]] = alpha[indx[k],vj]
> endfor

You can remove one level of loops,

```
trace = total(alpha[indx,indx])
alpha[indx,indx] += flamda
for j = 0, n-1 do alpha(indx[j],indx) = alpha(indx,indx[j])
```

If you can convert to unpermuted matrices, then you can use the
TRANSPOSE function,

```
alpha_prime = (alpha[indx,*])[*,indx]
alpha_prime_transpose = transpose(alpha_prime)
```

> ;Loop 2
> for j=0, n-1 do begin
> vj = indx[j]
> for k=0,n-1 do array[indx[k],j] =
> alpha[indx[k],vj]/sqrt(alpha[vj,vj]*alpha[indx[k],indx[k]])
> endfor

Again, it's probably worth converting to unpermuted matrices.

```
alpha_prime_diag = alpha[indx]
for j = 0, n-1 do $
  array_prime[*,j] = alpha_prime[*,j] / sqrt(alpha[j,j]*alpha_prime_diag)


>  ;Loop 3
>  for j=0, n-1 do begin
>      vj = indx[j]
>      b[vj] = T[vj] ;T is some init value
>      for k=0, n-1 do begin
>         vk = indx[k]
>         b[vj] += beta[vk]*array[k,j]/sqrt(alpha[vj,vj]*alpha[vk,vk])
>      endfor
>  endfor
```

Again, converting to unpermuted matrices,

```
for j = 0, n-1 do $
  b[j] = T[j] +  total(beta*array_prime(*,j)/sqrt(alpha_prime_diag[j]*alpha_p rime_diag))
```

...although it's a little confusing which of your matrices are
permuted and which are not, so that may require some tweaking.

Good luck,
Craig

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